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Ohashi et al.

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[54] **IMAGE-FORMING MACHINE HAVING AN IMAGE FORMING UNIT MOVABLE FROM AN ACTING POSITION TO A NON-ACTING POSITION**

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Apr. 28, 1998 [JP] Japan 10-118406

[51] **Int. Cl.**[7] **G03G 21/18**; G03G 15/01
[52] **U.S. Cl.** **399/110**; 399/112; 399/299
[58] **Field of Search** 399/110, 111, 399/112, 113, 126, 167, 299

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Attorney, Agent, or Firm—Smith Gambrell & Russell, LLP

[57] **ABSTRACT**

An image-forming machine which has an image-forming unit that moves substantially horizontally between an acting position in a housing and a non-acting position that is drawn out forward. The image-forming unit has a frame having a front wall member and a rear wall member, and a plurality of image-forming devices mounted on the frame. The front wall has a pair of receiving holes arranged at a distance in the transverse direction and the rear wall has a pair of pins located at a distance in the transverse direction. In a preferred embodiment, the housing has a pair of pins located in the front and a pair of receiving holds in the rear such that when the image-forming unit is brought to the acting position, the receiving holes of the front wall engage the front pins of the housing and the pins on the rear wall engage the receiving holes in the rear of the housing. Each of the image-forming devices includes a rotary shaft, a rotary drum mounted on the rotary shaft, and bearing members fitted to both ends of the rotary shaft. The bearing members have a cylindrical outer peripheral surface. Both the front and rear wall members have a mounting plate with mounting notches that are opened upward. The mounting notches have two support edges which, when the bearing members of the image-forming devices are introduced therein from the upper side, support the bearing members. Releasable locking members are also provided to lock the image-forming devices in position.

13 Claims, 9 Drawing Sheets

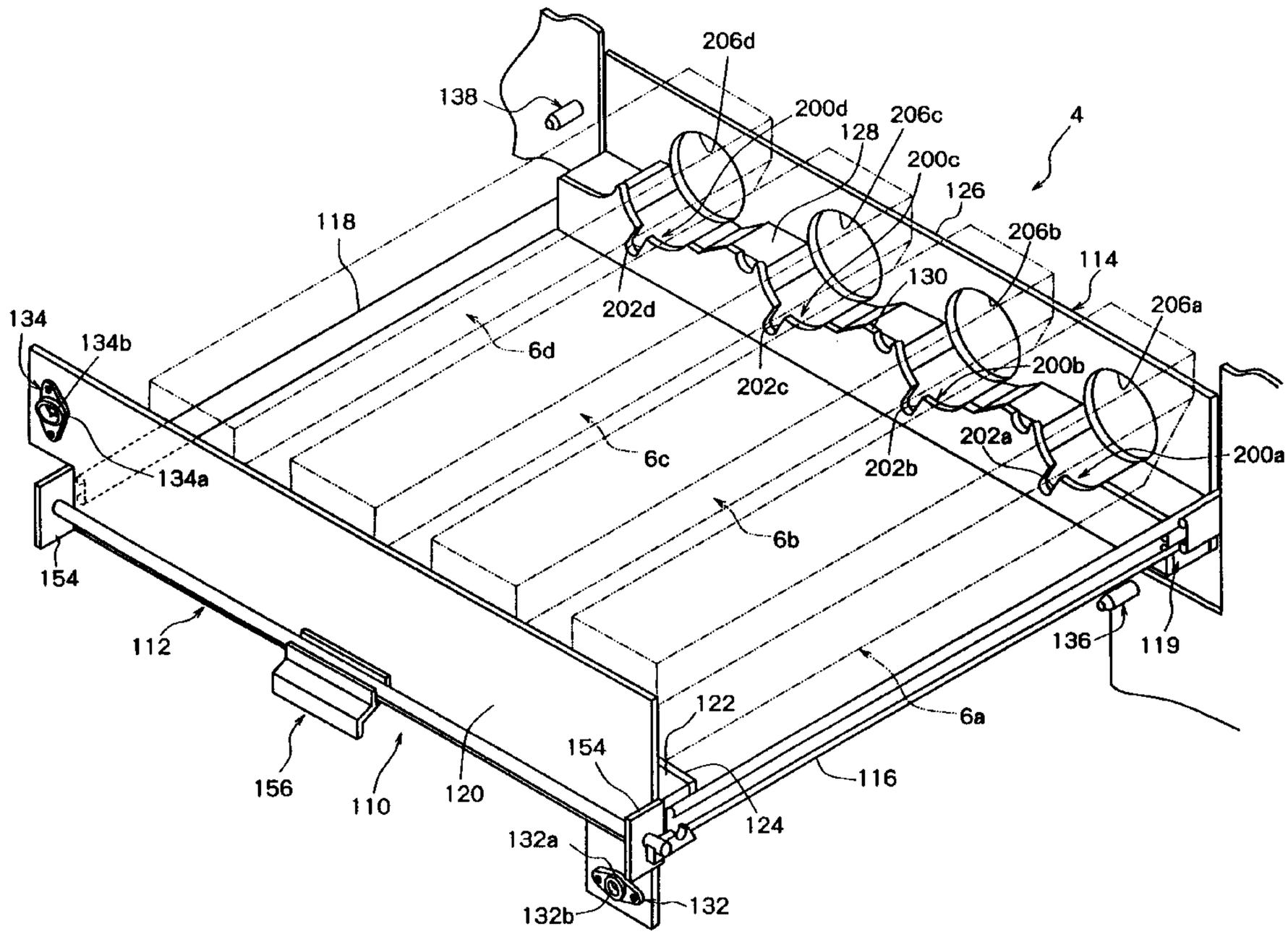
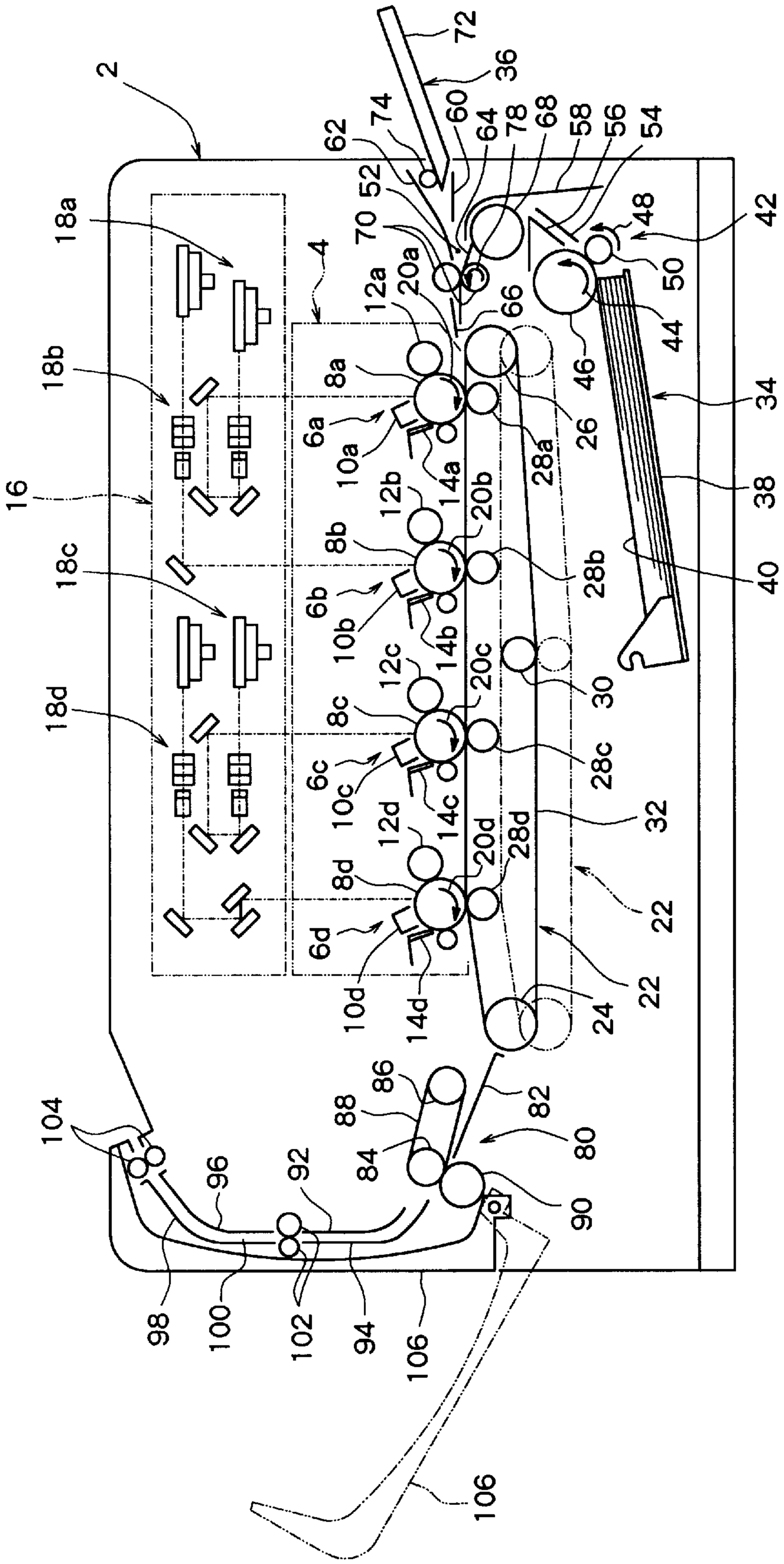


FIG. 1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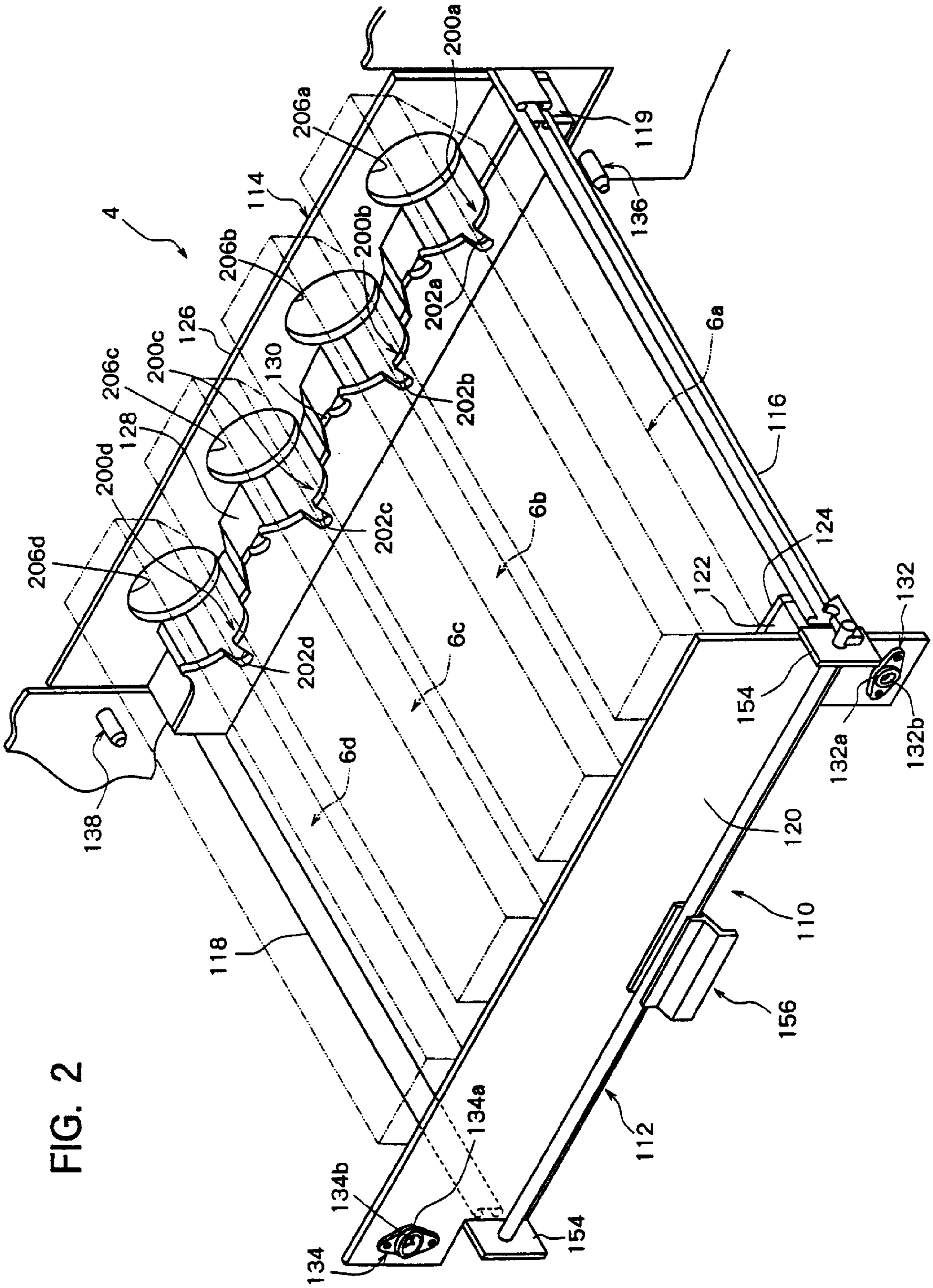
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202c
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122
132
6c
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FIG. 2

FIG. 3

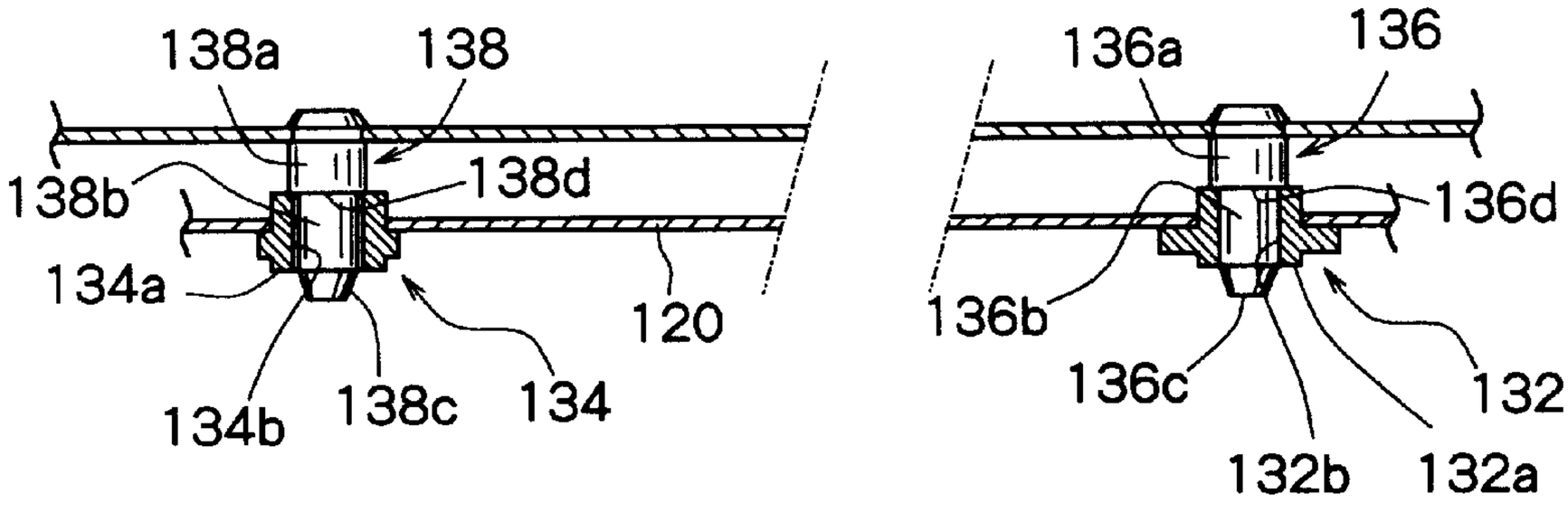
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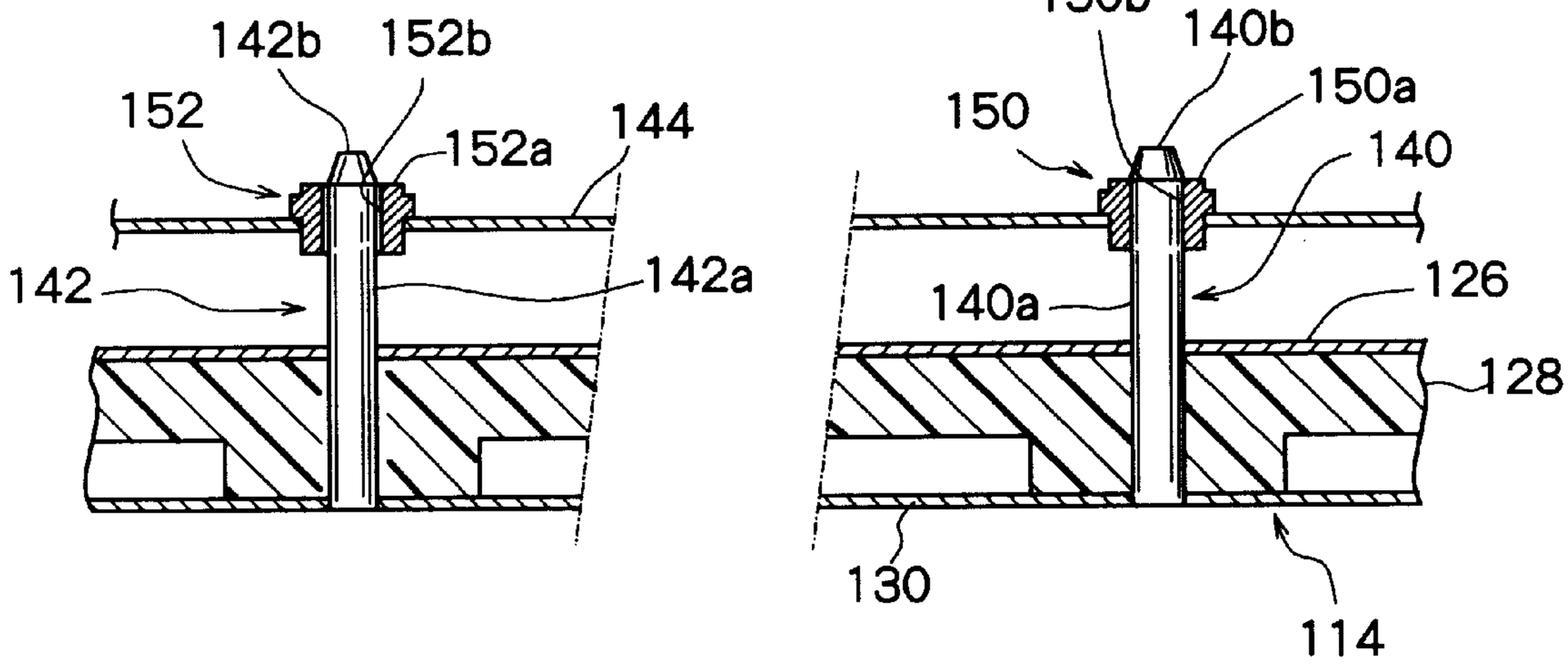
FIG. 4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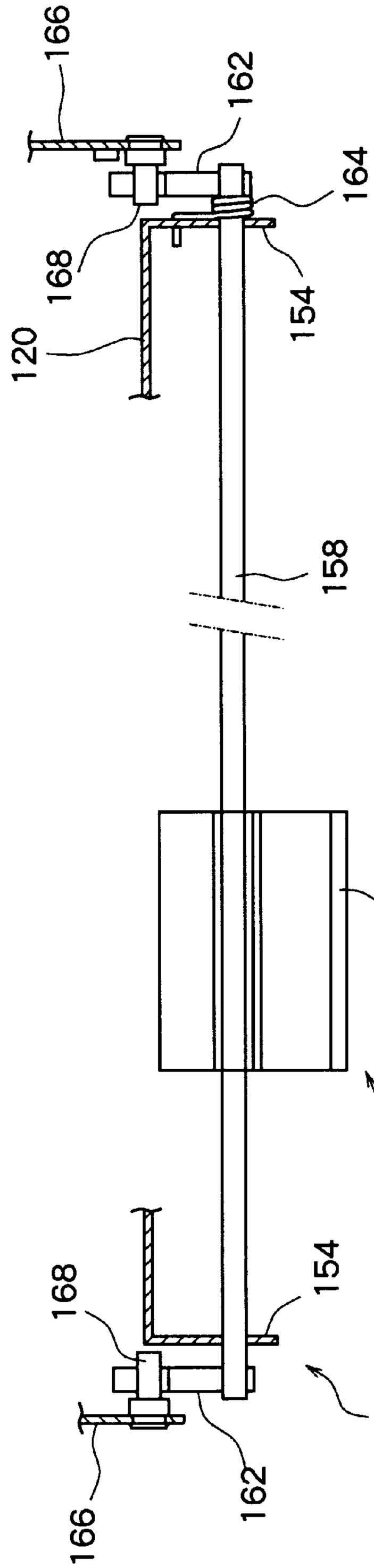


FIG. 5

FIG. 6

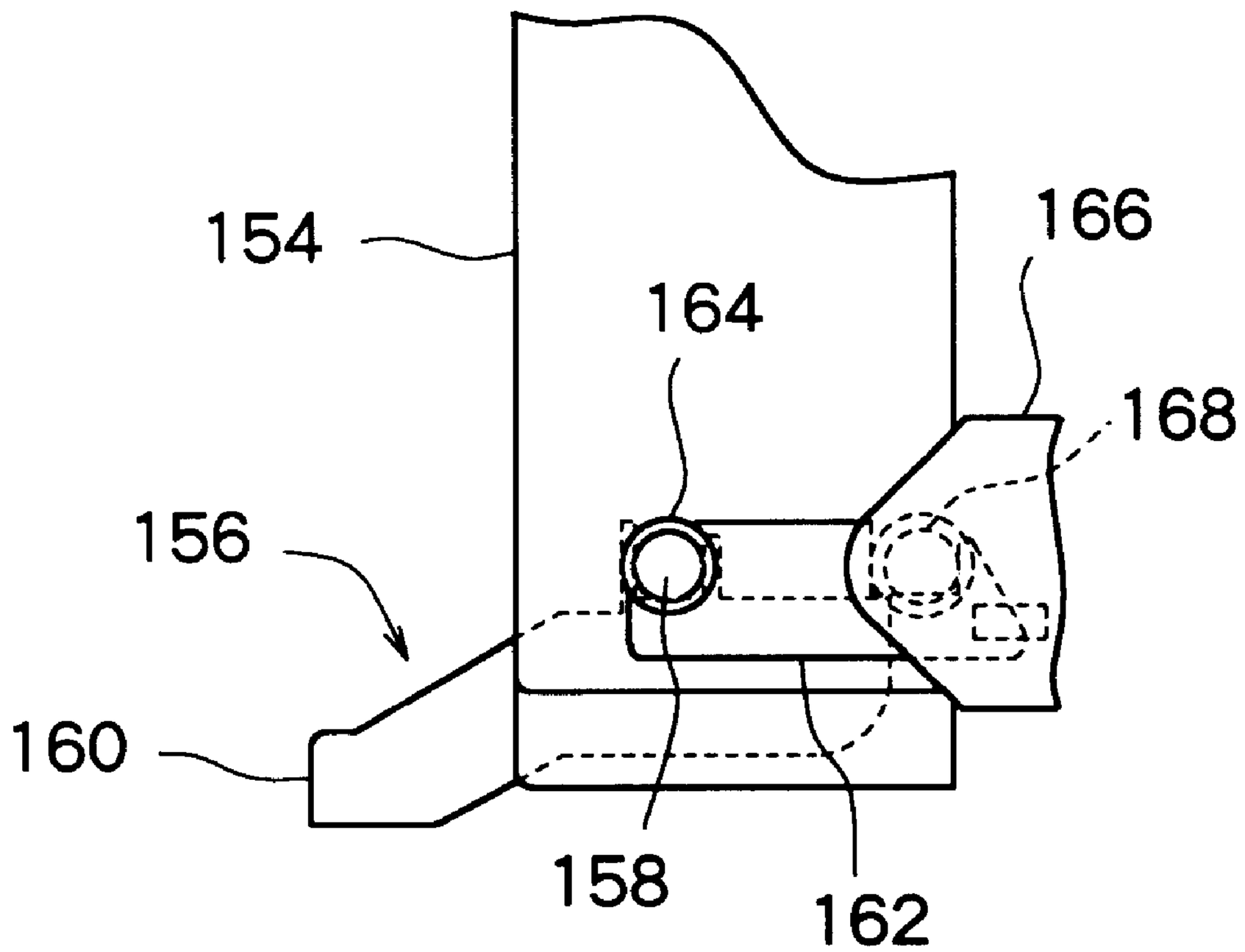
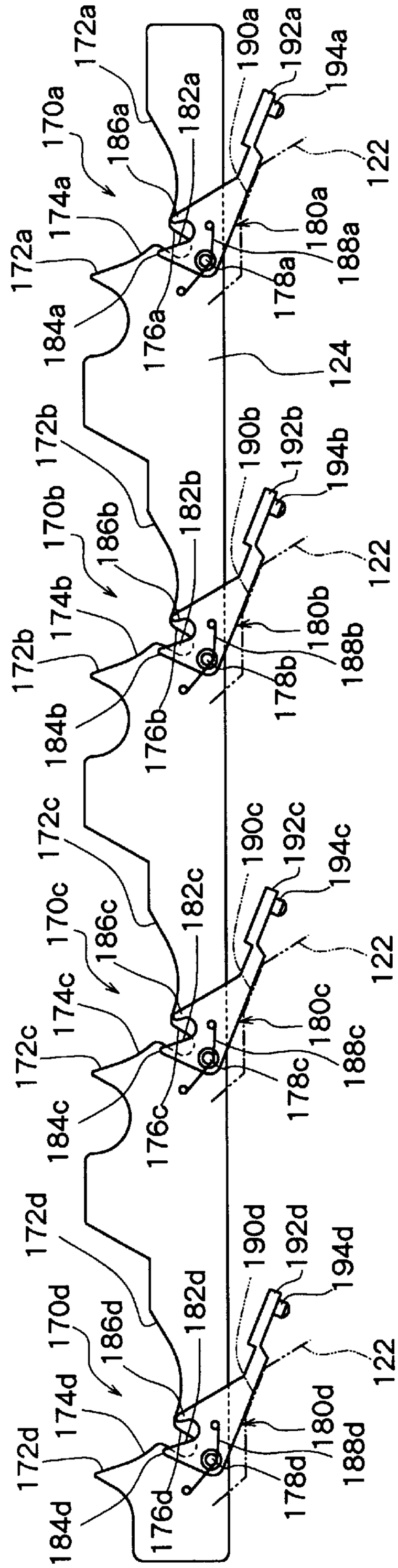


FIG. 7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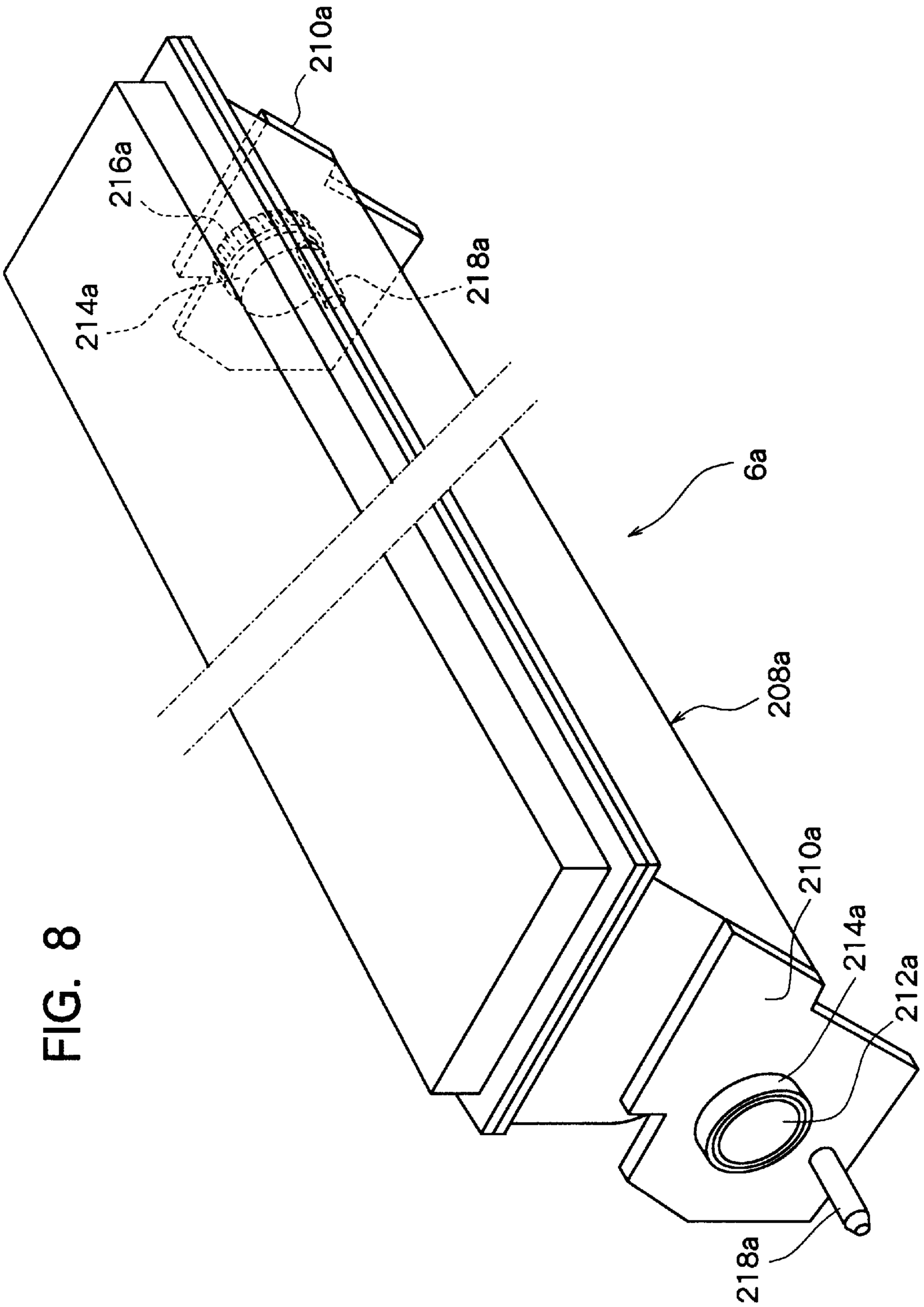
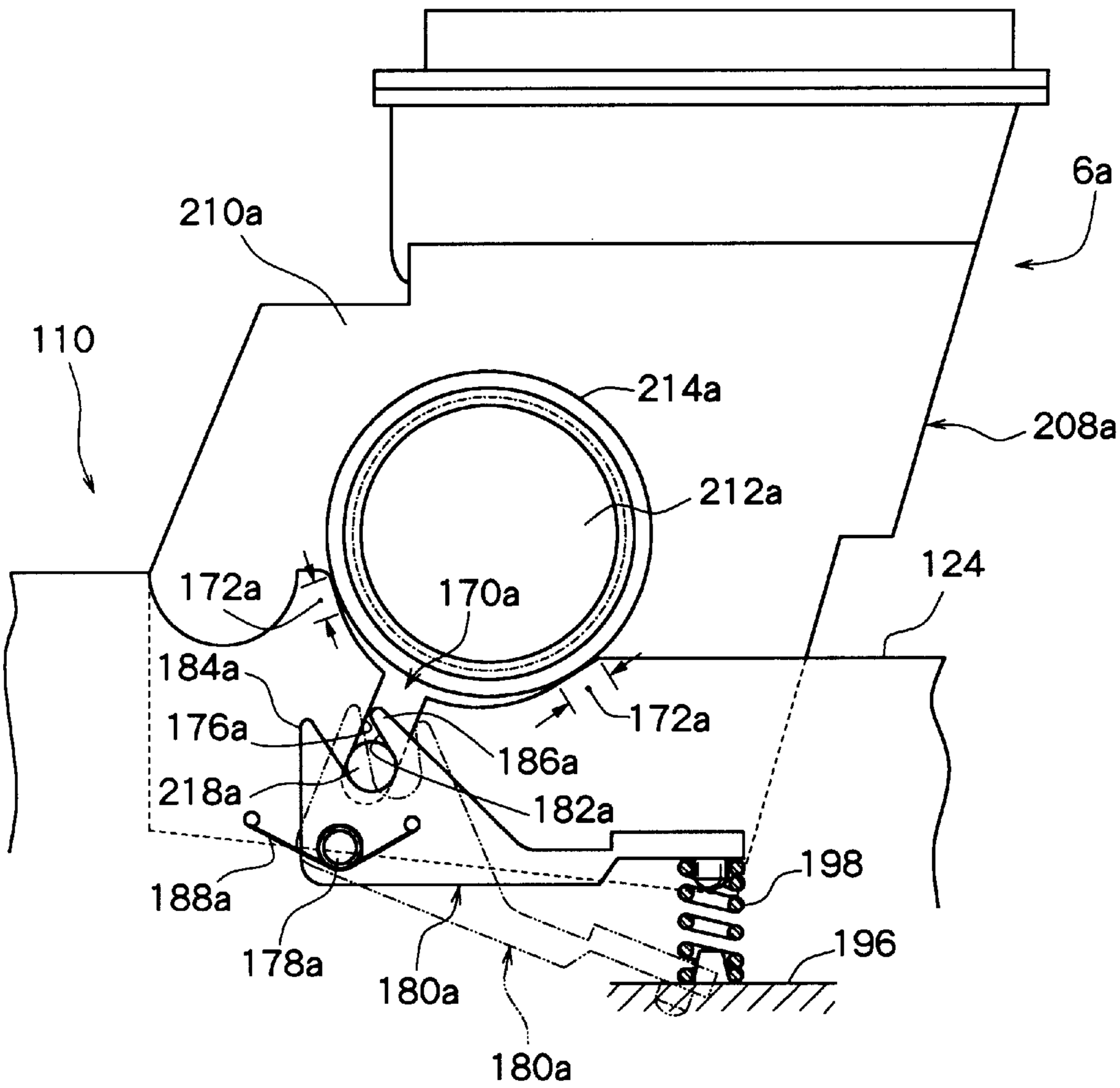


FIG. 8

FIG. 9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180a

FIG. 10

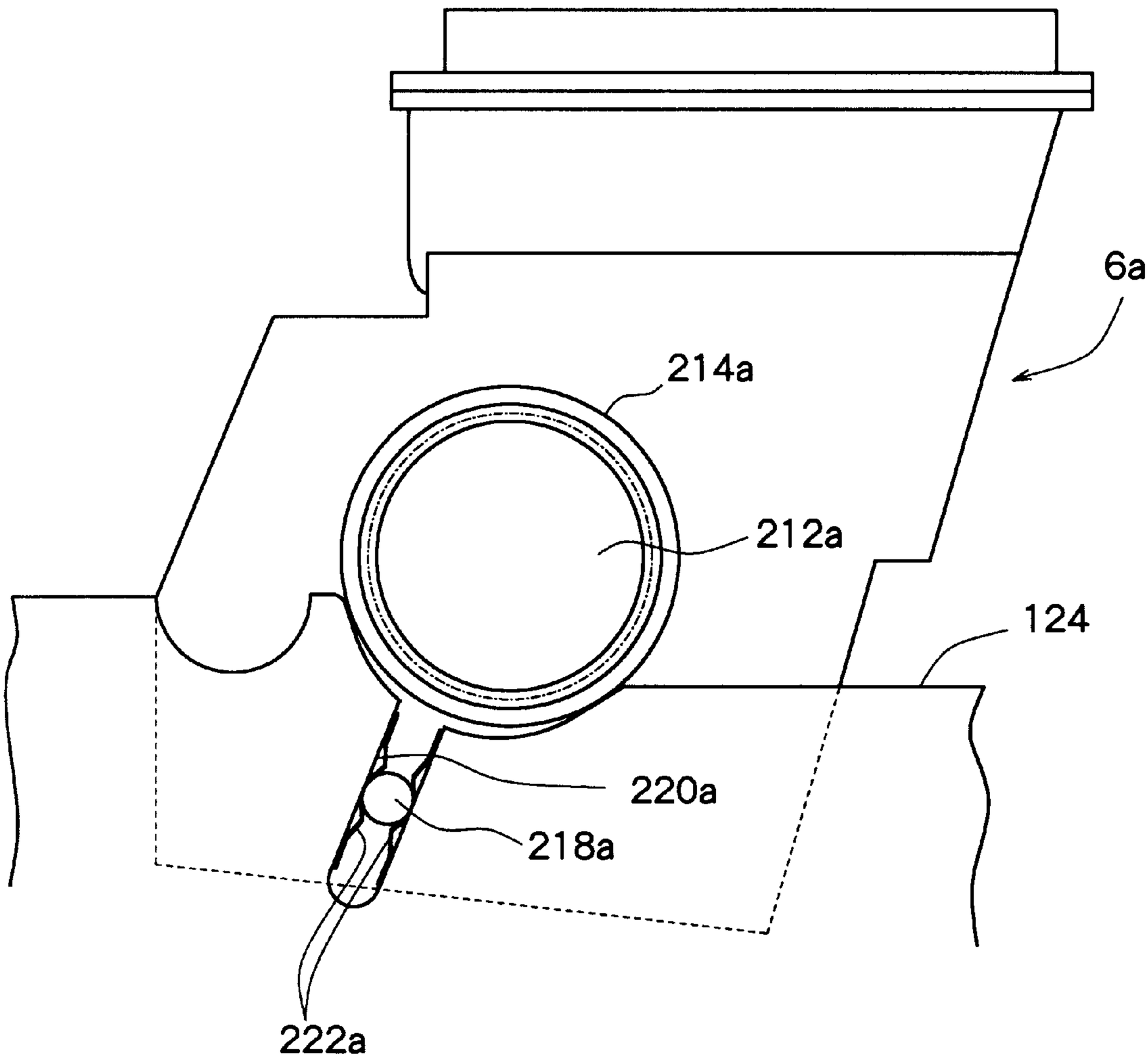

IMAGE-FORMING MACHINE HAVING AN IMAGE FORMING UNIT MOVABLE FROM AN ACTING POSITION TO A NON-ACTING POSITION

FIELD OF THE INVENTION

The present invention relates to an image-forming machine equipped with an image-forming unit that is allowed to freely move between an acting position in a housing and a non-acting position drawn out from the acting position. More specifically, the invention relates to an image-forming machine capable of forming a color image and equipped with an image-forming unit that freely moves, in which there are arranged a plurality of image-forming means for forming toner images of different colors, though the invention is not limited thereto only.

DESCRIPTION OF THE PRIOR ART

As is widely known among people skilled in the art, there have heretofore been proposed image-forming machines such as printer, copying machine and facsimile and, particularly, the one capable of forming color images selectively, which comprises an image-forming unit that is allowed to freely move between an acting position in a housing and a non-acting position drawn out from the acting position. The image-forming unit includes a frame on which are mounted four image-forming means arranged in tandem, i.e., a black toner image-forming means, a magenta toner image-forming means, a cyan toner image-forming means and a yellow toner image-forming means. Each of these image-forming means is provided with a rotary drum having an electrostatic photosensitive material disposed on the peripheral surface thereof. A transfer belt means is usually arranged beneath the image-forming unit. When a color image is formed, a black toner image, a magenta toner image, a cyan toner image and a yellow toner image are formed on the rotary drums of the four image-forming means and then, these toner images are successively transferred onto a sheet member that is conveyed by a transfer belt means, whereby the color image is formed on the sheet member.

In the image-forming machine of the above-mentioned type, when, for example, the sheet members are jammed in the conveyer passage or when the toner is exhausted in any of the image-forming means, the image-forming unit must be drawn out from the acting position in the housing to the non-acting position to remove the jammed sheet members or to replenish the toner and, then, the image-forming unit must be returned back to the acting position in the housing. Moreover, when the rotary drums have aged in the image-forming means in the image-forming unit, the image-forming unit must be drawn out from the acting position in the housing to the non-acting position to allow removal of the image-forming means from the frame so that it may be repaired or replaced by a new one. And then, the repaired or newly replaced one must be again mounted on the frame and, thereafter, the image-forming unit must be returned back to the acting position in the housing.

In order to form a good color image stably, on the other hand, it is important that the frame of the image-forming unit is brought to the acting position in the housing with a sufficient degree of precision, and that the image-forming means are mounted on the frame at their predetermined positions with the utmost precision.

In the image-forming machine of the above-mentioned type, therefore, it is desired to move the image-forming unit

between. the acting position in the housing and the non-acting position drawn out from the acting position very easily and quickly and to bring the image-forming unit to the acting position with great precision without causing the structure to become too complex and without increasing the cost of production. It is further desired to very easily and quickly attach/detach the image-forming means to/from the frame of the image-forming unit and to bring the image-forming means to their predetermined positions with a sufficient degree of certainty without causing the structure to become too complex and without increasing the cost of production. In practice, however, the existing image-forming machines are still not capable of satisfying the above-mentioned requirements to a sufficient degree.

SUMMARY OF THE INVENTION

The object of the present invention is to provide a novel and improved image-forming machine which, without creating distinct problems such as a great increase in the cost of production or the like, enables the image-forming unit to move between an acting position in a housing and a non-acting position drawn out from the acting position very easily and quickly, and to be brought to the acting position with a sufficient degree of precision.

Another object of the present invention is to provide a novel and improved image-forming machine which, without raising a new problem such as a great increase in the cost of production or the like, enables the image-forming means to be detached from, and attached to, the frame of the image-forming unit very easily and quickly, and to be mounted on their predetermined positions with a sufficient degree of precision.

In order to accomplish the above-mentioned objects according to one aspect of the present invention, there is provided an image-forming machine comprising a housing and an image-forming unit allowed to freely move substantially horizontally between an acting position in said housing and a non-acting position drawn out forward from said acting position,

said image-forming unit including a frame that has a front wall member and a rear wall member arranged at a distance in the back-and-forth direction;

wherein a pair of position-limiting means are arranged at a distance in the transverse direction on each of said front wall member and said rear wall member of said frame in said image-forming unit, and

said housing includes a pair of front stationary position-limiting means and a pair of rear stationary position-limiting means, and when said image-forming unit is brought to said acting position, said pair of position-limiting means of said front wall member work in cooperation with said pair of front stationary position-limiting means and said pair of position-limiting means of said rear wall member work in cooperation with said pair of rear stationary position-limiting means, so that said image-forming unit is limited to said acting position.

Desirably, amongst said pair of position-limiting means of said front wall member and of said pair of front stationary position-limiting means there is included a first pair of receiving holes that extend substantially horizontally, and first pair of pins that extend substantially horizontally; and, amongst said pair of position-limiting means said rear wall member and said pair of rear stationary position-limiting means there is included a second pair of pins that extend substantially horizontally, and and a second pair of receiving

holes that extend substantially horizontally. According to a preferred embodiment, amongst said first and second pairs of pins there is included round pins having a circular shape in cross section, and, amongst said first and second pairs of receiving holes, there is included receiving holes having a circular shape with an inner diameter corresponding to an outer diameter of a respective round pin positioned for insertion therein, and there is further included another receiving hole that has an elongated shape that extends maintaining a width corresponding to an outer diameter of a respective round pin positioned for insertion therein. Annular shoulder surfaces are formed on said first pair of pins, and front ends of said first pair of receiving holes come into contact with said annular shoulder surfaces thereby to limit the position of said image-forming unit in the back-and-forth direction. Or, annular shoulder surfaces are formed on said second pair of pins means, and the front ends of said second pair of receiving holes come into contact with said annular shoulder surfaces thereby to limit the position of said image-forming unit in the back-and-forth direction. It is desired that locking means are disposed to releasably lock said image-forming unit at said acting position. According to a preferred embodiment, said image-forming unit includes four image-forming means that are mounted on said frame, arranged in tandem, in a direction which is substantially perpendicular to the direction in which said image-forming unit moves and is substantially horizontal, said four image-forming means being a black toner image-forming means, a magenta toner image-forming means, a cyan toner image-forming means and a yellow toner image-forming means.

In order to accomplish the above-mentioned objects according to another aspect of the present invention, there is provided an image-forming machine comprising a housing and an image-forming unit allowed to freely move between an acting position in said housing and a non-acting position drawn out from said acting position,

said image-forming unit including a frame that has a front wall member and a rear wall member arranged at a distance in the back-and-forth direction, and at least one image-forming means detachably mounted on said frame, and

said image-forming means including a rotary shaft, a rotary drum mounted on said rotary shaft, and bearing members fitted to both ends of said rotary shaft, said bearing members having a cylindrical outer peripheral surface;

wherein each of said front wall member and said rear wall member of said frame includes a mounting plate having mounting notches that are opened upward, and said mounting notches have two support edges which, when said bearing members of said image-forming means are introduced into said mounting notches from the upper side, support said bearing members at two positions which maintain a distance in the circumferential direction on the outer peripheral surfaces of said bearing members.

According to a preferred embodiment, said frame has four image-forming means that are mounted thereon, arranged in tandem, in a direction which is substantially perpendicular to the direction in which said image-forming unit moves and is substantially horizontal, said four image-forming means being a black toner image-forming means, a magenta toner image-forming means, a cyan toner image-forming means and a yellow toner image-forming means. It is desired that the support edges extend straight. According to a preferred embodiment, each mounting plate has mounting slits that extend downward from said mounting notches between said two support edges, said image-forming means has engaging pins that are positioned beneath said bearing members and protrude substantially in parallel with said rotary shaft, said mounting slits have a width corresponding to the outer diameter of said engaging pins, and said engaging pins are introduced into said mounting slits so that said bearing members are supported by said two support edges. Locking members are mounted on said mounting plate to freely move between a locking position and an unlocking position and, when said locking members are moved from said unlocking position to said locking position after said engaging pins are introduced into said mounting slits, said locking members engage with said engaging pins from the upper side to prevent said engaging pins from moving upward in said mounting slits. Said locking members are mounted to freely turn between said locking position and said unlocking position. Said locking members have pairs of arm portions for defining a locking slit having a width corresponding to the outer diameter of said engaging pins, and when said locking members are located at said unlocking positions, ones of said pairs of arms extend across said mounting slits and the other ones of said pairs of arms retract from said mounting slits, and when said engaging pins are introduced into said mounting slits, said engaging pins are introduced into said locking slits and come into contact with the ones of said pairs of arms to cause said locking members to move from said unlocking positions to said locking positions, whereby the ones of said pairs of arms are positioned beneath said engaging pins and the other ones of said pairs of arms are positioned above said engaging pins. Desirably, resilient urging means are disposed to resiliently urge said locking members toward said unlocking positions with a relatively small force. In said housing, there is disposed a transfer belt means positioned beneath said image-forming unit when said image-forming unit is located at said acting position, said transfer belt means includes a lift frame that freely ascends and descends between an ascended position and a descended position, and said lift frame is provided with resilient urging means which are separated away from said locking members when said lift frame is located at said descended position, but, when said lift frame is brought to said ascended position, come in contact with said locking members to resiliently urge said locking members toward said locking positions with a relatively large force. Instead of the locking members, there can be disposed holding members in said mounting slits to resiliently hold said engaging pins that are introduced into said mounting slits.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a sectional view schematically illustrating the entire image-forming machine constituted according to a preferred embodiment of the present invention;

FIG. **2** is a partial perspective view illustrating an image-forming unit in the image-forming machine shown in FIG. **1** in a state where it is drawn out to the non-acting position;

FIG. **3** is a partial sectional view illustrating a pair of position-limiting means arranged on a front wall member in the image-forming unit, which work in cooperation with a pair of front stationary position-limiting means arranged in a housing, in the image-forming machine shown in FIG. **1**;

FIG. **4** is a partial sectional view illustrating a pair of position-limiting means arranged on a rear wall member in the image-forming unit, which work in cooperation with a pair of rear stationary position-limiting means arranged in the housing, in the image-forming machine shown in FIG. **1**;

FIG. **5** is a partial sectional view illustrating a locking means arranged in the image-forming unit in the image-forming machine shown in FIG. **1**;

FIG. **6** is a partial side view illustrating the locking means shown in FIG. **5**;

FIG. **7** is a front view illustrating an inner mounting plate of the front wall member in the image-forming unit shown in FIG. **2**;

FIG. **8** is a perspective view illustrating an image-forming means in the image-forming unit shown in FIG. **2**;

FIG. **9** is a partial enlarged view illustrating a manner of mounting the image-forming means on a frame in the image-forming unit shown in FIG. **2**; and

FIG. **10** is a partial enlarged view similar to FIG. **9**, and illustrates a modified example of the locking means.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

Preferred embodiments of the image-forming machine constituted according to the present invention will now be described in further detail with reference to the accompanying drawings.

FIG. **1** schematically illustrates the entire constitution of a color image-forming machine constituted according to the present invention. The illustrated image-forming machine is equipped with a housing **2** of nearly a rectangular parallelopiped shape. An image-forming unit **4** is arranged nearly at the central portion of the housing **2**. On the image-forming unit **4** are mounted four image-forming means, i.e., a black toner image-forming means **6***a*, a magenta toner image-forming means **6***b*, a cyan toner image-forming means **6***c* and a yellow toner image-forming means **6***d*. As will be described later in detail, the image-forming unit **4** is equipped with a frame which is allowed to freely move substantially horizontally between an acting position in the housing **2** and a non-acting position drawn forward in a direction perpendicular to the surface of the paper in FIG. **1** from the acting position. On the frame, the above-mentioned image-forming means **6***a*, **6***b*, **6***c* and **6***d* are mounted. The image-forming means **6***a*, **6***b*, **6***c* and **6***d* include, respectively, rotary drums **8***a*, **8***b*, **8***c* and **8***d*, which are surrounded by charging means **10***a*, **10***b*, **10***c* and **10***d*, developing means **12***a*, **12***b*, **12***c* and **12***d*, and cleaning means **14***a*, **14***b*, **14***c* and **14***d*. An electrostatic photosensitive material is disposed on the peripheral surfaces of the rotary drums **8***a*, **8***b*, **8***c* and **8***d*.

If further described with reference to FIG. **1**, in the housing **2** is arranged an optical unit **16** positioned above the image-forming unit **4**. The optical unit **16** includes four optical means, i.e., an optical means **18***a* for forming a black toner image, an optical means **18***b* for forming a magenta toner image, an optical means **18***c* for forming a cyan toner image and an optical means **18***d* for forming a yellow toner image. The optical means **18***a*, **18***b*, **18***c* and **18***d* may be of a known form including a source of a laser beam (not shown) and optical elements such as rotary polyhedral mirrors, lenses, reflectors and the like for laser beam scanning. To form a black toner image, the peripheral surface of the rotary drum **8***a* that is rotated in a direction indicated by an arrow **20***a* is electrically charged uniformly by a charging means **10***a*. Then, the electric charge is selectively removed from the peripheral surface of the rotary drum **8***a* by the irradiation with light from the optical means **18***a* and, thus, an electrostatic latent image is formed on the peripheral surface of the rotary drum **8***a*. Then, the electrostatic latent image is developed into a black toner image by the developing means **12***a*. The black toner image is, then, transferred onto a sheet member in a manner that will be described later. After the image has been transferred, the black toner remaining on the rotary drum **8***a* is removed by the cleaning means **14***a*. A magenta toner image, a cyan toner image and a yellow toner image are formed on the rotary drums **8***b*, **8***c* and **8***d* that are rotated in the directions indicated by arrows **20***b*, **20***c* and **20***d* substantially in the same manner as described above. The image-forming means **6***a*, **6***b*, **6***c* and **6***d*, and the optical means **18***a*, **18***b*, **18***c* and **18***d* may be of known forms, and do not constitute a novel feature of the image-forming machine that is improved by the present invention, and are not, hence, described in detail in this specification.

In the housing **2** is further disposed a transfer belt means **22**. The transfer belt means **22** is mounted to be allowed to freely ascend and descend between an active position indicated by a solid line in FIG. **1** and a non-acting position indicated by a two-dotted chain line in FIG. **1**. The illustrated transfer belt means **22** includes a driven roller **24**, a tension roller **26**, a black toner image-transfer roller **28***a*, a magenta toner image-transfer roller **28***b*, a cyan toner image-transfer roller **28***c*, a yellow toner image-transfer roller **28***d*, an auxiliary roller **30**, and an endless belt **32** wrapped round them. When the transfer belt means **22** is brought to the acting position, the transfer rollers **28***a*, **28***b*, **28***c* and **28***d* are positioned being respectively opposed to the rotary drums **8***a*, **8***b*, **8***c* and **8***d* of the image-forming means **6***a*, **6***b*, **6***c* and **6***d* enabling the endless belt **32** to be brought into contact with (or close to) the rotary drums **8***a*, **8***b*, **8***c* and **8***d*. When the transfer belt means **22** is descended to the non-acting position from the acting position, on the other hand, the endless belt **32** is lowered to separate away from the rotary drums **8***a*, **8***b*, **8***c* and **8***d* of the image-forming means **6***a*, **6***b*, **6***c* and **6***d*.

If further described with reference to FIG. **1**, a first sheet member feed means **34** and a second sheet member feed means **36** are disposed in the illustrated image-forming machine. The first sheet member feed means **34** includes a sheet member-placing plate **38** on which a plurality of pieces of sheet members **40** will be placed, and a sheet member-sending means **42** for delivering sheet members **40** piece by piece from the placing plate **38**. The sheet member-sending means **42** is constituted by a sending roller **46** that rotates in a direction indicated by an arrow **44** and a separation roller **50** that rotates in a direction indicated by an arrow **48**. The sheet member **40** fed from the first sheet member feed means **34** passes through a conveyer passage **52** and is fed to the above-mentioned transfer belt means **22**. The conveyer passage **52** is defined by guide plates **54**, **56**, **58**, **60**, **62**, **64** and **66**. In the conveyer passage **52** are disposed a conveyer roller **68** and a pair of resist rollers **70**. The second sheet member feed means **36** includes a sheet member-placing plate **72** on which a plurality of pieces of sheet members **40** will be placed, and a sending roller **74** for delivering the sheet members **40** piece by piece from the placing plate **72**. The sheet member **40** fed from the second sheet member feed means **36** passes through between the guide plate **62** and the guide plate **60**, and is fed to the pair of resist rollers **70**. The pair of resist rollers **70** are rotated in a direction indicated by an arrow **78** in synchronism with the operations of the image-forming means **6***a*, **6***b*, **6***c* and **6***d*, so that the sheet member **40** fed from the first sheet member feed means **34** or the second sheet member feed means **36** is fed to the transfer belt means **22** or, more specifically, to between the endless belt **32** of the transfer belt means **22** at the acting position indicated by a solid line and the rotary drums **8***a*, **8***b*, **8***c* and **8***d* of the image-forming means **6***a*, **6***b*, **6***c* and **6***d*. The first sheet member feed means **34** and the second sheet member feed means **36** may be of known forms, and are not described in detail in this specification.

A fixing means **80** is disposed on the downstream side of the transfer belt means **22**, and a guide plate **82** is disposed between the fixing means **80** and the transfer belt means **22**. The fixing means **80** which may be of a known form is constituted by an endless belt **88** wrapped round a fixing roller **84** and a heating roller **86**, and a pushing roller **90**. A discharge passage **100** is defined by guide plates **92**, **94**, **96** and **98** on the downstream side of the fixing means **80**, and a pair of conveyor rollers **102** and **104** are disposed in the discharge passage **100**. The discharge passage **100** extends up to a receiving portion formed on the upper surface of the housing **2**. In the illustrated image-forming machine, there is further disposed a receiving tray **106** that is selectively brought to a non-acting position indicated by a solid line and an acting position indicated by a two-dotted chain line. Between the fixing means **80** and the discharge passage **100**, there is disposed a discharge direction change-over means (not shown to simplify the drawing) for selectively guiding the sheet member **40** sent from the fixing means **80** to either the discharge passage **100** or the receiving tray **106** located at the acting position.

To form a color image by using the above-mentioned image-forming machine, the sheet member **40** sent from the first sheet member feed means **34** or the second sheet member feed means **36** is conveyed passing through between the image-forming unit **4** and the transfer belt means **22**. At this moment, onto the sheet member **40** are successively transferred a black toner image from the rotary drum **8***a* of the image-forming means **6***a*, a magenta toner image from the rotary drum **8***b* of the image-forming means **6***b*, a cyan toner image from the rotary drum **8***c* of the image-forming means **6***c*, and a yellow toner image from the rotary drum **8***d* of the image-forming means **6***d*. Thus, a color image is formed on the sheet member **40**. Through the fixing means **80**, the color image is fixed on the sheet member **40**, and the sheet member **40** is then discharged through the discharge passage **100** onto the receiving portion formed on the upper surface of the housing **2** or onto the receiving tray **106** located at the acting position indicated by a two-dotted chain line. To form a black image on the sheet member **40**, the black toner image is transferred onto the sheet member **40** from the rotary drum **8***a* of the image-forming means **6***a*. Here, however, the toner images are not transferred onto the sheet member **40** from the rotary drums **8***b*, **8***c* and **8***d* of other image-forming means **6***b*, **6***c* and **6***d* (in this case, the transfer rollers **28***b*, **28***c* and **28***d* of the transfer belt means **22** are retracted to be slightly lower than the positions indicated by solid lines).

FIG. **2** illustrates a state where a front cover (not shown) of the housing **2** is opened and the above-mentioned image-forming unit **4** is drawn out to the non-acting position. As clearly shown in FIG. **2**, the image-forming unit **4** has a frame **110**. The frame **110** has a front wall member **112**, a rear wall member **114**, and side wall members **116** and **118** on both sides. The end on one side of the front wall member **112** and the end on one side of the rear wall member **114** are coupled together by the side wall member **116**, and the end on the other side of the front wall member **112** and the end on the other side of the rear wall member **114** are coupled together by the side wall member **118**. The frame **110** is mounted at its both side wall members **116** and **118** on the housing **2** via a suitable mounting means **119** (e.g., a mounting means placed in the market in the trade name of "Accuride", part of which is illustrated in FIG. **2**) so as to freely move substantially horizontally between the acting position in the housing **2** and the non-acting position (i.e., a position shown FIG. **2**) drawn out forward from the acting position. The above-mentioned image-forming means **6***a*, **6***b*, **6***c* and **6***d* are detachably mounted on the frame **110** being arranged in tandem in a direction substantially perpendicular to the direction in which the frame **110** moves and substantially in a horizontal direction, i.e., in the right-and-left direction in FIG. **1**. The manner of mounting the image-forming means **6***a*, **6***b*, **6***c* and **6***d* on the frame **110** will be described later in further detail.

If further described with reference to FIG. **2**, in the illustrated embodiment, the front wall member **112** of the frame **110** is constituted by three pieces of plates that are coupled together by bolts or joined together by a suitable means such as adhesion, i.e., constituted by an outer plate **120** which is a steel plate, an intermediate plate **122** and an inner mounting plate **124** that are made of a synthetic resin. Similarly, the rear wall member **114** of the frame **110** is constituted by three pieces of plates that are coupled together by bolts or joined together by a suitable means such as adhesion, i.e., constituted by an outer plate **126** which is a steel plate, an intermediate plate **128** and an inner mounting plate **130** that are made of a synthetic resin. If described with reference to FIG. **2** together with FIG. **3**, in the front wall member **112** of the frame **110**, the outer plate **120** has protruded portions on both sides thereof, and limiting members **132** and **134** are secured to the protruded portions. The limiting member **132** has a main portion **132***a* of a cylindrical shape that extends substantially horizontally, and in the main portion **132***a* is formed a through receiving hole **132***b* having a circular shape in cross section. The limiting member **134** has a main portion **134***a* of a flat circular shape that extends substantially horizontally, and in the main portion **134***a* is formed a through receiving hole **134***b* of an elongated shape extending in the transverse direction in cross section. A pair of pins **136** and **138** are secured to the front portion of the housing **2** via suitable support brackets. The pins **136** and **138** are arranged substantially horizontally, and have cylindrical base portions **136***a* and **138***a* of a relatively large diameter, intermediate portions **136***b* and **138***b* of a cylindrical shape, and end portions **136***c* and **138***c* that are tapered. Annular shoulder surfaces **136***d* and **138***d* are formed between the base portions **136***a*, **138***a* and the intermediate portions **136***b*, **138***b*. The inner diameter of the receiving hole **132***b* is substantially the same as the outer diameter of the intermediate portion **136***b* of the pin **136**, and the width of the receiving hole **134***b* is substantially the same as the outer diameter of the intermediate portion **138***b* of the pin **138**. If described with reference to FIG. **2** together with FIG. **4**, on the rear wall member **114** of the frame **110**, there are disposed a pair of pins **140** and **142** that protrude rearward from the base ends secured to the inner mounting plate **130**, penetrating through the intermediate plate **128** and the outer plate **126**. These pins **140** and **142** are arranged substantially horizontally, and have main cylindrical portions **40***a* and **142***a*, and tapered end portions **140***b* and **142***b*. On the other and, an upright substrate **144** is disposed at the rear part of the housing **2**, and a pair of limiting members **150** and **152** are secured to the upright substrate **144**. The limiting member **150** has a main portion **150***a* of a cylindrical shape that extends substantially horizontally, and in the main portion **150***a* is formed a through receiving hole **150***b* having a circular shape in cross section. The limiting member **152** has a main portion **152***a* of a flat cylindrical shape that extends substantially horizontally, and in the main portion **152***a* is formed a through receiving hole **152***b* having an elongated shape extending in the transverse direction in cross section. The inner diameter of the receiving hole **150***b* is substantially the

same as the outer diameter of the main portion **140***a* of the pin **140**, and the width of the receiving hole **152***b* is substantially the same as the outer diameter of the main portion **142***a*. As will be comprehended with reference to FIG. **2** together with FIGS. **3** and **4**, when the frame **110** of the image-forming unit **4** is moved rearward from the non-acting position shown in FIG. **2** to the acting position shown in FIGS. **1**, **3** and **4**, the pins **136** and **138** disposed on the front part of the housing **2** are inserted up to their intermediate portions **136***b* and **138***b* in the receiving holes **132***b* and **134***b* disposed in the front wall member **112** of the frame **110**, and the annular shoulder surfaces **136***d* and **138***d* of the pins **136** and **138** come into contact with the ends of the main portions **132***a* and **134***a* of the limiting members **132** and **134** (i.e., ends of the receiving holes **132***b* and **134***b*). Furthermore, the pins **140** and **142** disposed in the rear wall member **114** of the frame **110** are inserted in the receiving holes **150***b* and **152***b* disposed in the rear part of the housing **2**. Even it there exists considerable play in the mounting means **120**, the frame **110** is positioned relative to the housing **2** on one side of the frame **110** in the back-and-forth direction with a sufficient degree of precision, owing to the cooperation of the pin **136** and the receiving hole **132***b* and the cooperation of the pin **140** and the receiving hole **150***b*. Furthermore, owing to the cooperation of the pin **138** and the receiving hole **134***b* and the cooperation of the pin **142** and the receiving hole **152***b*, the frame **110** is prevented from turning about the above-mentioned one side as a center or, more specifically, about the center axis of the pins **136** and **140** as a center. Accordingly, the receiving holes **132***b* and **134***b* disposed in the front wall member **112** of the frame **110** constitute a pair of position-limiting means which works in cooperation with a pair of front stationary position-limiting means constituted by the pins **136** and **138** disposed on the front part of the housing **2**. The pins **140** and **142** disposed on the rear wall member **114** of the frame **110** constitute a pair of position-limiting means which work in cooperation with the rear stationary position-limiting means constituted by the receiving holes **150***b* and **152***b* disposed at the rear part of the housing **2**. Further, the position of the frame **110** in the back-and-forth direction relative to the housing **2** is limited as the annular shoulder surfaces **136***d* and **138***d* of the pins **136** and **138** come into contact with the ends of the main portions **132***a* and **134***a* of the limiting members **132** and **134** (i.e., ends of the receiving holes **132***b* and **134***b*). Thus, although the image-forming unit **4** is allowed to be selectively brought to the acting position and to the non-acting position very easily, the image-forming unit **4** is placed to a predetermined position in the housing **2** with a sufficient degree of precision, when brought to the acting position. Then, when the frame **110** is moved to the acting position, the locking means automatically locks the frame **110** to the acting position, as will be described below.

The locking means will now be described with reference to FIGS. **5** and **6**. On the outer plate **120** of the front wall member **112** of the frame **110**, there are formed a pair of upright walls **154** that protrude forward at a distance in the transverse direction, and a locking means **156** is mounted on the upright walls **154**. The locking means **156** is constituted by a rotary shaft **158** rotatably mounted between the upright walls **154**, an operation lever **160** secured to a central portion of the rotary shaft **158**, and hooks **162** secured to both ends of the rotary shaft **158** that extend beyond the upright walls **154**. At one end of the rotary shaft **158** (right end in FIG. **5**), there is disposed a coil spring **164** with its one end being secured to the upright wall **154** and its other end being secured to the rotary shaft **158** in order to resiliently urge the rotary shaft **158** in the counterclockwise direction in FIG. **6**. The rotary shaft **158**, operation lever **160** and hooks **162** are resiliently urged toward the locking position indicated by solid lines in FIGS.**5** and **6**. A stopper piece (not shown) is disposed on the front surface of the outer plate **120**. When the locking means **156** is brought to the locking position indicated by a solid line in FIGS. **5** and **6**, the operation lever **160** comes in contact with the stopper piece so that the locking means **156** is prevented from turning in the counterclockwise direction in FIG. **6** beyond the locking position. As clearly shown in FIG. **6**, the rear end edge of the hooks **162** is tilted downward toward the rear side (toward the right in FIG. **6**). On the front part of the housing **2**, too, there are arranged a pair of upright walls **166** protruding forward on both sides of the upright walls **154**, and lock pins **168** are secured to the upright walls **166**. When the frame **110** moves to the acting position shown in FIGS. **1**, **3** to **6** from the non-acting position that is drawn forward from the housing **2**, the rear end edges of the hooks **162** of the locking means **156** come in contact with the lock pins **168**, whereby the locking means **156** is turned to some extent in the clockwise direction in FIG. **6** against the resilient urging action of the coil spring **164**. Then, as the ends of the hooks **162** pass over the lock pins **168**, the locking means **156** is caused to turn up to the locking position in the counterclockwise direction in FIG. **6** due to the resilient urging action of the coil spring **164**, whereby the hooks **162** are brought into engagement with the lock pins **168**. Thus, the frame **110** or the image-forming unit **4** is releasably locked at the acting position. To draw out the image-forming unit **4** to the non-acting position, the operation lever **160** of the locking means **156** is turned by a finger in the clockwise direction in FIG. **6**, so that the hooks **162** are liberated from the lock pins **168** and then, are pulled forward.

If further described with reference to FIG. **2** together with FIG. **7**, four mounting notches **170***a*, **170***b*, **170***c* and **170***d* are formed in the inner mounting plate **124** of the front wall member **112** of the image-forming unit **110** at a predetermined distance in the right-and-left direction in FIG. **7**. The mounting notches **170***a*, **170***b*, **170***c* and **170***d* are opened upward. The mounting notches **170***a*, **170***b*, **170***c* and **170***d* in the illustrated embodiment have support edges **172***a*, **172***b*, **172***c* and **172***d* that extend straight in the neighborhood of both ends thereof. Edges **174***a*, **174***b*, **174***c* and **174***d* positioned between the support edges **172***a*, **172***b*, **172***c* and **172***d* may have an arcuate shape. In the central portions of the arcuate edges **174***a*, **174***b*, **174***c* and **174***d*, there are formed mounting slits **176***a*, **176***b*, **176***c* and **176***d* that extend downward being inclined toward the left side in FIG. **7**. Considerably large notches are formed in the intermediate plate **122** of the front wall member **112** to correspond to the mounting notches **170***a*, **170***b*, **170***c* and **170***d* and to the mounting slits **176***a*, **176***b*, **176***c* and **176***d* of the inner mounting plate **124**.

If further described with reference to FIG. **7**, mounting pins **178***a*, **178***b*, **178***c* and **178***d* that protrude substantially horizontally are secured to the outer surface of the inner mounting plate **124** in relation with the mounting slits **176***a*, **176***b*, **176***c* and **176***d*, and locking members **180***a*, **180***b*, **180***c* and **180***d* are rotatably mounted on the mounting pins **178***a*, **178***b*, **178***c* and **178***d*. The locking members **180***a*, **180***b*, **180***c* and **180***d* have pairs of arms **184***a*, **184***b*, **184***c*, **184***d* and **186***a*, **186***b*, **186***c* and **186***d* that define lock slits **182***a*, **182***b*, **182***c* and **182***d*. The width of the lock slits **182***a*, **182***b*, **182***c* and **182***d* may be substantially the same as the width of the mounting slits **176***a*, **176***b*, **176***c* and **176***d*. Resilient urging means **188***a*, **188***b*, **188***c* and **188***d* consti-

tuted by coil springs are fitted onto the mounting pins **178***a*, **178***b*, **178***c* and **178***d*, the ends on one side of the resilient urging means **188***a*, **188***b*, **188***c* and **188***d* being secured to the inner mounting plate **124** and the ends on the other side thereof being secured to the locking members **180***a*, **180***b*, **180***c* and **180***d*. The resilient urging means **188***a*, **188***b*, **188***c* and **188***d* resiliently urge the locking members **180***a*, **180***b*, **180***c* and **180***d* with a relatively small force in the clockwise direction in FIG. **7**, and bring the locking members **180***a*, **180***b*, **180***c* and **180***d* to unlocking positions shown in FIG. **7**. At the unlocking positions, the lower edges of the locking members **180***a*, **180***b*, **180***c* and **180***d* come in contact with contact edges **190***a*, **190***b*, **190***c* and **190***d* of the intermediate plate **122**, whereby the locking members **180***a*, **180***b*, **180***c* and **180***d* are prevented from turning in the clockwise direction beyond the unlocking positions. At the unlocking positions, the arms **184***a*, **184***b*, **184***c* and **184***d* on one side of the locking members **180***a*, **180***b*, **180***c* and **180***d* extend across the mounting slits **176***a*, **176***b*, **176***c* and **176***d*, and the arms **186***a*, **186***b*, **186***c* and **186***d* on the other side are retracted from the mounting slits **176***a*, **176***b*, **176***c* and **176***d*.

The locking members **180***a*, **180***b*, **180***c* and **180***d* have, respectively, input levers **192***a*, **192***b*, **192***c* and **192***d*, and cylindrical protrusions **194***a*, **194***b*, **194***c* and **194***d* are formed at the front lower edges of the input levers **192***a*, **192***b*, **192***c* and **192***d*. As will be further described later with reference to FIG. **9**, the afore-mentioned transfer belt means **22** is equipped with a lift frame **196** (on which are mounted the afore-mentioned driven roller **24**, tension roller **26**, transfer rollers **28***a*, **28***b*, **28***c* and **28***d*, and auxiliary roller **30**). Four resilient urging means **198** which may be coil springs (only one of them is shown in FIG. **9**) are disposed on the lift frame **196**. When the transfer belt means **22** is descended to the non-acting position indicated by a two-dotted chain line in FIG. **1**, the resilient urging means **198** are separated away from the locking members **180***a*, **180***b*, **180***c* and **180***d*. When the transfer belt means **22** is ascended to the acting position indicated by a solid line in FIG. **1**, however, the resilient urging means **198** are fitted to the cylindrical protrusions **194***a*, **194***b*, **194***c* and **194***d*, come in contact with the front lower edges of the input levers **192***a*, **192***b*, **192***c* and **192***d* of the locking members **180***a*, **180***b*, **180***c* and **180***d*, and resiliently urge the locking members **180***a*, **180***b*, **180***c* and **180***d* with a relatively strong force (i.e., urging force considerably larger than the urging force of the resilient urging means **188***a*, **188***b*, **188***c* and **188***d*) in the counterclockwise direction in FIGS. **7** and **9**.

The inner mounting plate **130** and the intermediate plate **128** of the rear wall member **114** of the frame **110** are substantially the same as the inner mounting plate **124** and the intermediate plate **122** of the front wall member **112**. As illustrated in FIG. **2**, four mounting notches **200***a*, **200***b*, **200***c*, **200***d* and four mounting slits **202***a*, **202***b*, **202***c* and **202***d* are formed in the inner mounting plate **130** of the rear wall member **114**, and four locking members (not shown) are mounted on the outer surface of the inner mounting plate **130**. On the lift frame **196** of the transfer belt means **22** are disposed resilient urging means (not shown) that act upon the four locking members mounted on the inner mounting plate **130**. In the rear wall member **114**, furthermore, four relatively large circular openings **206***a*, **206***b*, **206***c* and **206***d* are formed in the outer plate **126** to correspond to the four mounting notches **200***a*, **200***b*, **200***c* and **200***d* of the inner mounting plate **130**.

FIG. **8** illustrates a black toner image-forming means **6***a* which includes a case **208***a* that can be molded using a suitable synthetic resin. The case **208***a* has both end walls **210***a* on which are rotatably mounted a rotary shaft **212***a* via bearing members **214***a*. The bearing members **214***a* may be of a known form having an inner race with a cylindrical inner peripheral surface and an outer race with a cylindrical outer peripheral surface, the inner race being secured to the rotary shaft **212***a* and the outer race being secured to the side wall **210***a*. The bearing members **214***a* protrude outward beyond the outer surfaces of both side walls **210***a*. The rotary drum **8***a* (FIG. **1**) is mounted on the main portion of the rotary shaft **212***a*, i.e., on a portion located in the case **208***a*. The rear end of the rotary shaft **212***a* extends rearward beyond the bearing member **214***a*, and an input gear **216***a* is fitted to the extended end portion. Engaging pins **218***a* are secured to both end walls **210***a* of the case **208***a*, at positions below the rotary shaft **212***a*. The engaging pins **218***a* protrude from the outer surfaces of both end walls **210***a* substantially in parallel with the rotary shaft **212***a*. Three other image-forming means, i.e., the magenta toner image-forming means **6***b*, cyan toner image-forming means **6***c* and yellow toner image-forming means **6***d*, are constituted substantially in the same manner as the black toner image-forming means **6***a*.

Described below with reference to FIG. **2** and FIGS. **7** to **9** is a manner of mounting the image-forming means **6***a* on the frame **110**. The case **208***a* of the image-forming means **6***a* is positioned between the front wall member **112** and the rear wall member **114** of the frame **110**, engaging pins **218***a* secured to both end walls **210***a* of the case **28***a* are introduced into the mounting slits **17** **6***a* formed in the inner mounting plate **124** of the front wall member **112** and into the mounting slits **202***a* formed in the inner mounting plate **130** of the rear wall member **114**, and bearing members **214***a* fitted to both ends of the rotary shaft **212***a* are introduced into the mounting notches **170***a* formed in the inner mounting plate **124** of the front wall member **112** and into the mounting notches **200***a* formed in the inner mounting plate **130** of the rear wall member **114**. As clearly shown in FIG. **9**, when the bearing member **214***a* is introduced into the mounting notch **170***a*, the two support edges **172***a* of the mounting notch **170***a* come in contact with the outer peripheral surface of the bearing member **214***a* thereby to support the bearing member **214***a* at two positions at a distance in the circumferential direction. The outer circumference of the bearing member **214***a* is of a cylindrical shape, whereas the support edges **172***a* of the mounting notch **170***a* are straight. Therefore, the support edges **172***a* come in point-contact with the bearing member **214***a* as viewed on a front view. If the thickness of the inner mounting plate **124** is taken into consideration, this contact is a line contact along the line extending in a direction perpendicular to the surface of the paper in FIG. **9**. Therefore, when the support edge **172***a* is formed sufficiently precisely, the bearing member **214***a* can be brought to a predetermined position with a sufficient degree of precision. On the other hand, the engaging pin **218***a* introduced in the mounting slit **176***a* interferes with one arm **184***a* of the locking member **180***a*, and turns the locking member **180***a* in the counterclockwise direction in FIG. **9**, against the resilient urging action of the resilient urging means **188***a*. And, when the engaging pin **218***a* is lowered down to a position where the bearing member **214***a* comes in contact with the support edge **172***a* of the mounting notch **170***a*, the locking member **180***a* is brought to a locking position shown in FIG. **9**. When the locking member **180***a* is turned up to the locking position, the engaging pin **218***a* is held in the lock slit **182***a*, one arm **184***a* of the locking member **180***a* is positioned beneath the engaging pin **218***a*,

and the other arm **186***a* of the locking member **180***a* is positioned above the engaging pin **218***a*. The bearing member **214***a* and the engaging pin **218***a* disposed on the rear side of the case **208***a* are similarly supported and held by the mounting notch **200***a* and mounting slit **202***a* formed in the inner mounting plate **130** of the rear wall member **114**. The input gear **216***a* fitted to the rear end of the rotary shaft **212***a* is positioned on the rear side of the rear wall member **114** passing through a circular opening **206***a* formed in the outer plate **126** of the rear wall member **114**. Three other image-forming means, i.e., magenta toner image-forming means **6***b*, cyan toner image-forming means **6***b* and yellow toner image-forming means **6***d*, are mounted on the frame **110** in substantially the same manner as the black toner image-forming means **6***a*.

When the frame **110** on which the image-forming means **6***a*, **6***b*, **6***c* and **6***d* are mounted, is brought to the acting position in the housing **2**, the input gears (FIG. **8** shows only the input gear **216***a* of the black toner image-forming means **6***a*) of the image-forming means **6***a*, **6***b*, **6***c* and **6***d* are coupled to the transmission gears (not shown) mounted in the housing **2**, and are further coupled to a rotary drive source which may be an electric motor through the transmission gears. Furthermore, when the lift frame **196** of the transfer belt means **22** is ascended to the acting position after the frame **110** of the image-forming unit **4** is brought to the acting position in the housing **2**, eight resilient urging means **198** disposed on the lift frame **196** act upon the locking members **180***a*, **180***b*, **180***c* and **180***d* to resiliently urge them to the locking positions with a relatively strong force as shown in FIG. **9**. Thus, the other arms **186***a*, **186***b*, **186***c* and **186***d* of the locking members **180***a*, **180***b*, **180***c* and **180***d* come into engagement with the engaging pins (engaging pins **218***a*, etc. shown in FIGS. **8** and **9**) from the upper side, so that the engaging pins are prevented from disengaging upward from the mounting slits **176***a*, **176***b*, **176***c*, **176***d* and **202***a*, **202***b*, **202***c* and **202***d*. Therefore, the image-forming means **6***a*, **6***b*, **6***c* and **6***d* are held at required mounting positions of the frame **110** with a sufficient degree of reliability by the action of the locking members **180***a*, **180***b*, **180***c* and **180***d* that are held at the locking positions due to their own weights and due to the resilient urging means **198**. Furthermore, since the engaging pins (engaging pins **218***a*, etc. shown in FIGS. **8** and **9**) are locked in the mounting slits **176***a*, **176***b*, **176***c*, **176***d* and **202***a*, **202***b*, **202***c* and **202***d*, the image-forming means **6***a*, **6***b*, **6***c* and **6***d* are reliably prevented from swinging or turning.

FIG. **10** illustrates a modified example of the mounting slit formed in the inner mounting plate **124**. In this modified example, holding members **222***a* are secured to both side edges of the mounting slit **220***a*. The holding members **222***a* formed of a spring steel plate has a recessed portion at the central portion in the lengthwise direction thereof. The engaging pin **218***a* introduced into the mounting slit **222***a* causes the holding members **222***a* to be resiliently deformed, and is positioned between the recessed portions and is resiliently held at this position.

Though the preferred embodiments of the image-forming machine constituted according to the present invention were described above in detail with reference to the accompanying drawings, it should be noted that the invention is in no way limited to the above-mentioned embodiments only but can be modified or change in various other ways without departing from the scope of the invention.

What we claim is:

1. An image-forming machine comprising a housing and an image-forming unit allowed to freely move substantially horizontally between an acting position in said housing and a non-acting position drawn forward from said acting position,

said image-forming unit including a frame that has a front wall member and a rear wall member arranged at a distance in a back-and-forth direction;

wherein a pair of position-limiting means are arranged at a distance in a direction transverse to the back-and-forth direction on each of said front wall member and said rear wall member of said frame in said image-forming unit, and

said housing includes a pair of front stationary position-limiting means and a pair of rear stationary position-limiting means, and when said image-forming unit is brought to said acting position, said pair of position-limiting means of said front wall member work in cooperation with said pair of front stationary position-limiting means and said pair of position-limiting means of said rear wall member work in cooperation with said pair of rear stationary position-limiting means, so that said image-forming unit is limited to said acting position, and

wherein, amongst said pair of position-limiting means of said front wall member and said pair of front stationary position-limiting means, there is included a first pair of receiving holes that extend substantially horizontally, and a first pair of pins that extend substantially horizontally; and, amongst said pair of position-limiting means of said rear wall member and of said pair of rear stationary position-limiting means, there is included a second pair of pins that extend substantially horizontally and a second pair of receiving holes that extend substantially horizontally, and

wherein annular shoulder surfaces are formed on said first pair of pins, and front ends of said first pair of receiving holes come into contact with said annular shoulder surfaces thereby to limit the position of said image-forming unit in the back-and-forth direction.

2. An image-forming machine comprising a housing and an image-forming unit allowed to freely move substantially horizontally between an acting position in said housing and a non-acting position drawn forward from said acting position,

said image-forming unit including a frame that has a front wall member and a rear wall member arranged at a distance in a back-and-forth direction;

wherein a pair of position-limiting means are arranged at a distance in a direction transverse to the back-and-forth direction on each of said front wall member and said rear wall member of said frame in said image-forming unit, and

said housing includes a pair of front stationary position-limiting means and a pair of rear stationary position-limiting means and when said image-forming unit is brought to said acting position, said pair of position-limiting means of said front wall member work in cooperation with said pair of front stationary position-limiting means and said pair of position-limiting means of said rear wall member work in cooperation with said pair of rear stationary position-limiting means, so that said image-forming unit is limited to said acting position, and

wherein, amongst said pair of position-limiting means of said front wall member and said pair of front stationary position-limiting means, there is included a first pair of receiving holes that extend substantially horizontally,

and a first pair of pins that extend substantially horizontally; and, amongst said pair of position-limiting means of said rear wall member and of said pair of rear stationary position-limiting means, there is included a second pair of pins that extend substantially horizontally and a second pair of receiving holes that extend substantially horizontally, and

wherein annular shoulder surfaces are formed on said second pair of pins, and front ends of said second pair of receiving holes come into contact with said annular shoulder surfaces thereby to limit the position of said image-forming unit in the back-and-forth direction.

3. An image-forming machine comprising a housing and an image-forming unit allowed to freely move substantially horizontally between an acting position in said housing and a non-acting position drawn forward from said acting position,

said image-forming unit including a frame that has a front wall member and a rear wall member arranged at a distance in a back-and-forth direction;

wherein a pair of position-limiting means are arranged at a distance in a direction transverse to the back-and-forth direction on each of said front wall member and said rear wall member of said frame in said image-forming unit, and

said housing includes a pair of front stationary position-limiting means and a pair of rear stationary position-limiting means, and when said image-forming unit is brought to said acting position, said pair of position-limiting means of said front wall member work in cooperation with said pair of front stationary position-limiting means and said pair of position-limiting means of said rear wall member work in cooperation with said pair of rear stationary position-limiting means, so that said image-forming unit is limited to said acting position; and

wherein locking means are disposed to releasably lock said image-forming unit at said acting position.

4. An image-forming machine comprising a housing and an image-forming unit allowed to freely move between an acting position in said housing and a non-acting position drawn out from said acting position,

said image-forming unit including a frame that has a front wall member and a rear wall member arranged at a distance in a back-and-forth direction, and at least one image-forming means detachably mounted on said frame, and

said at least one image-forming means including a rotary shaft, a rotary drum mounted on said rotary shaft, and bearing members fitted to both ends of said rotary shaft, said bearing members having a cylindrical outer peripheral surface;

wherein each of said front wall member and said rear wall member of said frame includes a mounting plate having mounting notches that are opened upward, and said mounting notches have two support edges which, when said bearing members of said image-forming means are introduced into said mounting notches from an upper side, support said bearing members at two positions which maintain a distance in a circumferential direction on the outer peripheral surfaces of said bearing members.

5. An image-forming machine according to claim **4**, wherein said frame has four image-forming means that are mounted thereon, arranged in tandem, in a direction which is substantially perpendicular to the direction in which said image-forming unit moves and is substantially horizontal, said four image-forming means being a black toner image-forming means, a magenta toner image-forming means, a cyan toner image-forming means and a yellow toner image-forming means.

6. An image-forming machine according to claim **4**, wherein said support edges extend straight.

7. An image-forming machine according to claim **4**, wherein each mounting plate has a mounting slit that extends downward from a corresponding one of said mounting notches between said two support edges, said image-forming means has engaging pins that are positioned beneath said bearing members and protrude substantially in parallel with said rotary shaft, said mounting slits have a width corresponding to an outer diameter of said engaging pins, and said engaging pins are introduced into said mounting slits so that said bearing members are supported by said two support edges.

8. An image-forming machine according to claim **9**, wherein locking members are mounted on said mounting plate to freely move between a locking position and an unlocking position and, when said locking members are moved from said unlocking position to said locking position after said engaging pins are introduced into said mounting slits, said locking members engage with said engaging pins from the upper side to prevent said engaging pins from moving upward in said mounting slits.

9. An image-forming machine according to claim **8**, wherein said locking members are mounted to freely turn between said locking position and said unlocking position.

10. An image-forming machine according to claim **9**, wherein said locking members have pairs of arm portions for defining a locking slit having a width corresponding to the outer diameter of said engaging pins, and when said locking members are located in said unlocking position, said pairs of arm portions include a first arm portion that extends across a corresponding mounting slit and a second arm portion retracted from a corresponding mounting slit, and when said engaging pins are introduced into said mounting slits, said engaging pins are introduced into said locking slits and come into contact with the first arm portions of said pairs of arm portions to cause said locking members to move from said unlocking position to said locking position, whereby the first arm portions of said pairs of arm portions are positioned beneath said engaging pins and the second arm portions of said pairs of arm portions are positioned above said engaging pins.

11. An image-forming machine according to claim **8**, wherein resilient urging means are disposed to resiliently urge said locking members toward said unlocking position with a relatively small force.

12. An image-forming machine according to claim **11**, wherein, in said housing, there is disposed a transfer belt means positioned beneath said image-forming unit when said image-forming unit is located at said acting position, said transfer belt means includes a lift frame that freely ascends and descends between an ascended position and a descended position, and said lift frame is provided with resilient urging means which are separated away from said locking members when said lift frame is located at said descended position, but, when said lift frame is brought to said ascended position, come in contact with said locking members to resiliently urge said locking members toward said locking position with a relatively large force.

13. An image-forming machine according to claim **7**, wherein holding members are disposed in said mounting slits to resiliently hold said engaging pins that are introduced into said mounting slits.

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